



Armed Forces College Of medicine AFCM

For getting success
There is only one lesson
Keep your focus on goal
And Go for it with Passion
Good Morning



Pathology of myocardial, pericardial diseases & heart failure

Prof. Eman Abdelbary

Intended Learning Objectives (ILOs)



By the end of this lecture the student will be able to:

1. Summarize causes, types, pathological features and complications of myocardial & pericardial diseases
2. Correlate between etiology, types, pathological features, investigations and complications of myocardial & pericardial diseases
3. List cardiac tumors
4. Summarize causes & pathological features of heart failure
5. Correlate between etiology, types, pathological features, investigations and complications of heart failure

Lecture plan



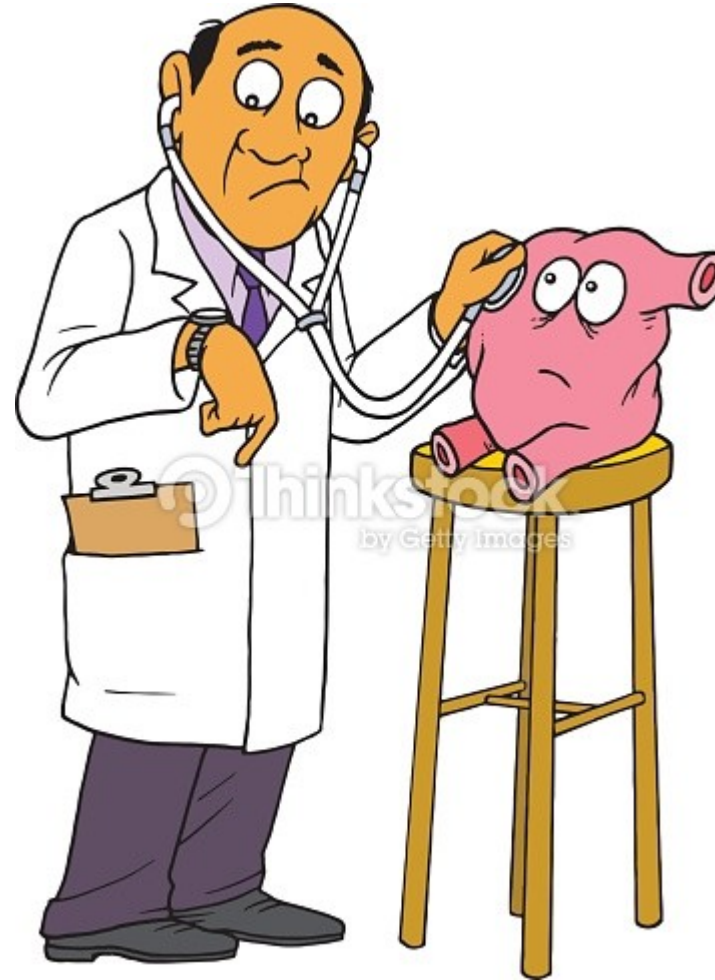
1. Part 1 (5 min): Cardiomyopathy
2. Part 2 (10 min): Myocarditis, cardiac tumors
3. Part 3 (15 min): Pericardial diseases
4. Part 4 (10 min): heart failure
5. Lecture Quiz (5 min)

Diseases of the myocardium



❖ **Cardiomyopathy**

❖ **Myocarditis**

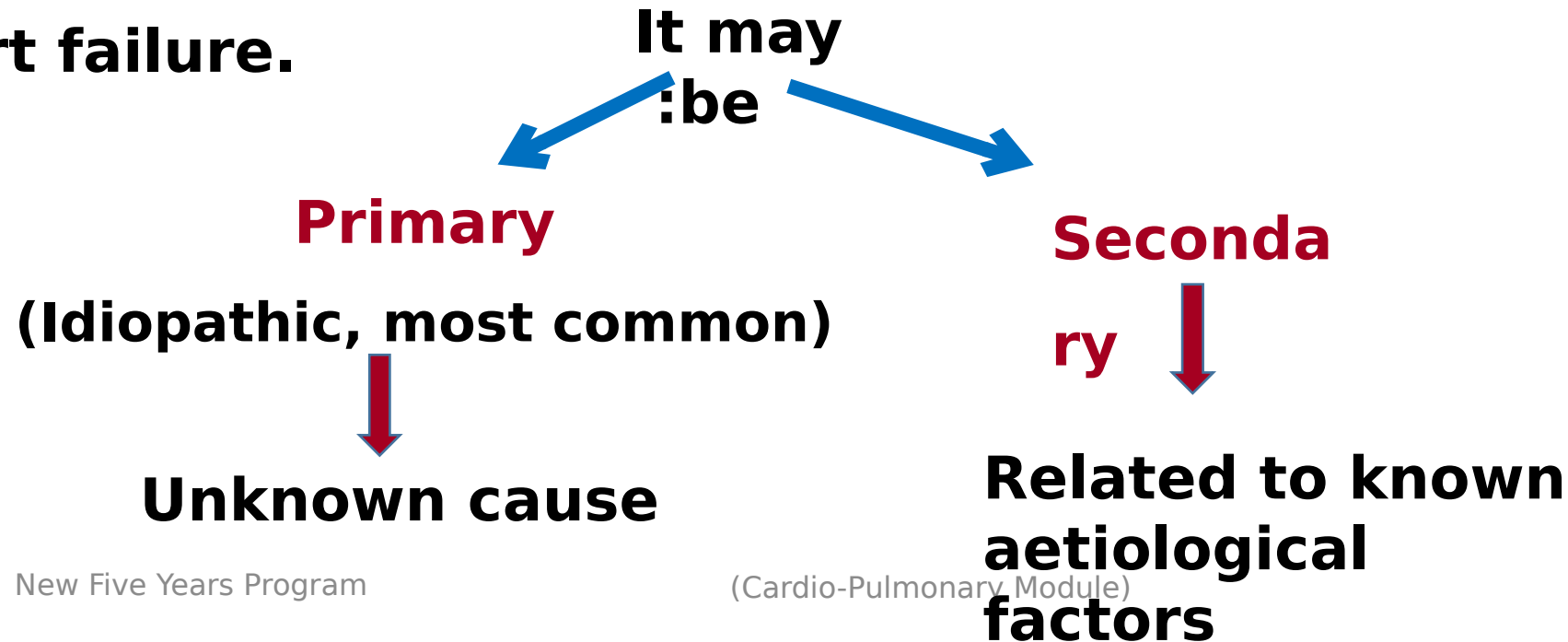


Cardiomyopathy



Definition: Myocardial disease associated with intrinsic cardiac dysfunction (mechanical / electric).

❖ They are characterized by marked dilatation, hypertrophy or stiffness, impaired contractility, arrhythmias & possibly heart failure.



Cardiomyopathy



Restrictive	Hypertrophic	Dilated	<i>Types:</i>
Obliterative cardiomyopathy	Idiopathic hypertrophic subaortic stenosis	Congestive cardiomyopathy	Synonym
<i>Rarest</i>	Rare	<i>Most common (90%)</i>	Incidence
<ul style="list-style-type: none"> - Primary - Secondary to amyloidosis, hemochromatosis, ... 	<ul style="list-style-type: none"> - Primary - Autosomal dominant inheritance (50% of cases) 	<ul style="list-style-type: none"> - Most commonly primary. - Secondary to alcoholism, coronary artery diseases, viral myocarditis.... 	Etiology
Cardiac rigidity Decreased diastolic filling Low CO	Asymmetrical Lt. ventricular hypertrophy particularly septal	Markedly dilated heart, <i>A thrombus</i> may be seen in cardiac chambers	Pathology

Cardiomyopathy



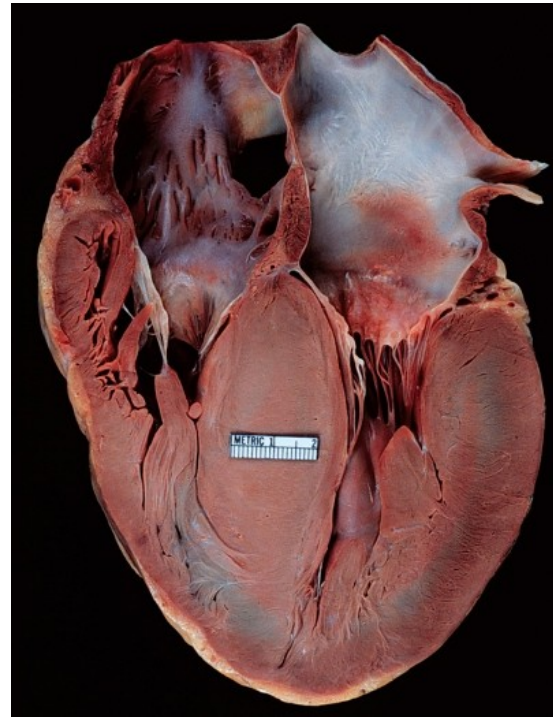
Dilated cardiomyopathy



<https://www.omicsgroup.org/articles-admin/disease-images/dilated-cardiomyopathy-57871.jpg>

New Five Years Program

Hypertrophic cardiomyopathy



https://thoracickey.com/wp-content/uploads/2016/06/m_hurs13_c033f002.jpeg

(Cardio-Pulmonary Module)

Restrictive cardiomyopathy



<https://thoracickey.com/wp-content/uploads/2016/08/C162-FF1.gif>

Cardiomyopathy (Quiz):



A 24-year-old male, a professional football player develops a severe chest pain during a game. Echocardiography reveals an asymmetrically thickened interventricular septum. Which of the following is the most likely diagnosis?

- A. Hypertrophic cardiomyopathy
- B. Constrictive pericarditis
- C. Dilated cardiomyopathy
- D. Restrictive cardiomyopathy
- E. Rheumatic myocarditis

Cardiomyopathy (Quiz):



A 24-year-old male, a professional football player develops a severe chest pain during a game. Echocardiography reveals an asymmetrically thickened interventricular septum. Which of the following is the most likely diagnosis?

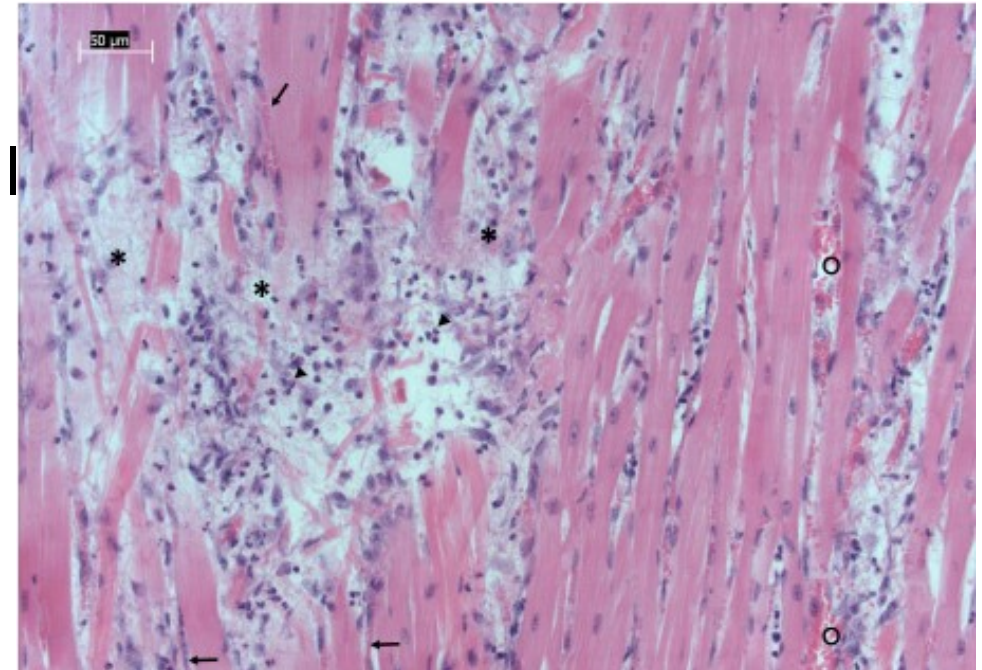
- A. Hypertrophic cardiomyopathy**
- B. Constrictive pericarditis
- C. Dilated cardiomyopathy
- D. Restrictive cardiomyopathy
- E. Rheumatic myocarditis

Myocarditis



Definition: Inflammation of the myocardium.

- ❑ Usually acute
- ❑ May resolve or progress to heart failure



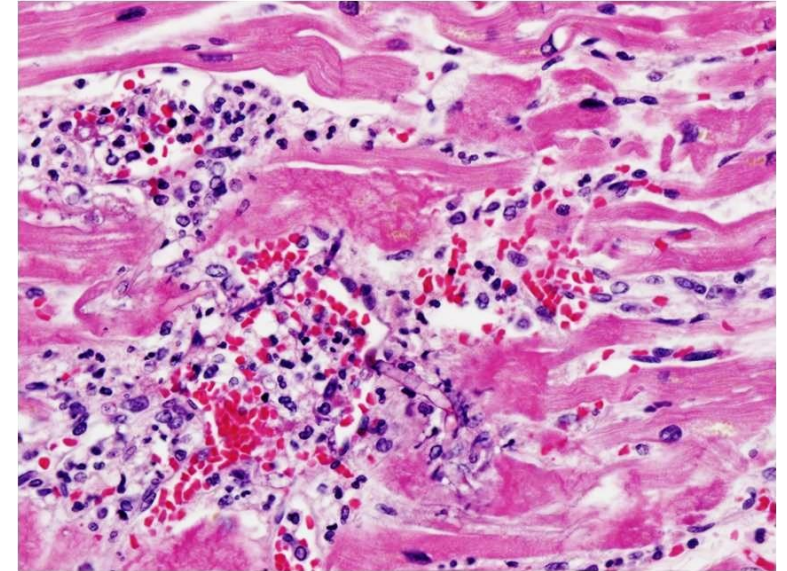
https://www.researchgate.net/profile/Tobias_Eisenberg/publication/262483884/figure/fig2/AS:296803716091905@1447774928278/Heart-left-ventricular-wall-showing-acute-suppurative-and-fibrinous-myocarditis-with.png

Myocarditis



Types:

- 1- Rheumatic myocarditis
- 2- Viral myocarditis (e.g. Coxsackie B)
- 3- Toxic myocarditis (Diphtheria)
- 4- Acute interstitial myocarditis
- 5- Suppurative myocarditis: (abscess) in septicemia
- 6- Chronic specific myocarditis: tuberculous, syphilitic, parasitic.
- 7- Radiation myocarditis



<http://img.medscape.com/pi/emed/ckb/pathology/1603817-160763-160763-1602252.jpg>

Tumors of the heart



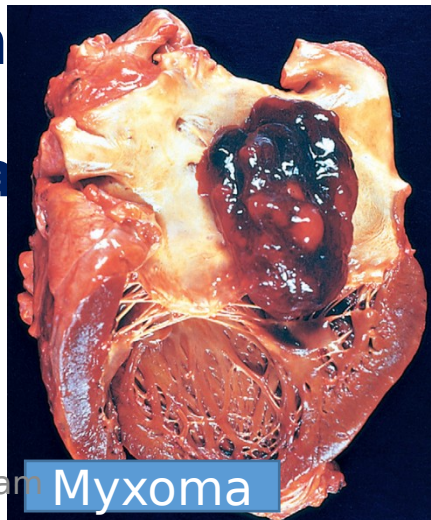
Benign

Myxoma (***Most common***)

Rhabdomyoma

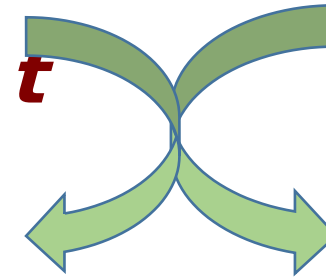
Fibroma

Lipoma



Myxoma

Malignant



Primary

Metastatic

(rare)

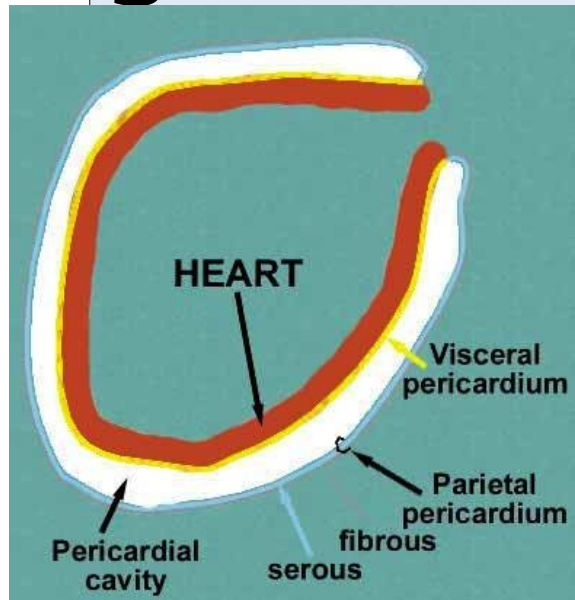
Rhabdomyosarcoma

Angiosarcoma

Diseases of the pericardium



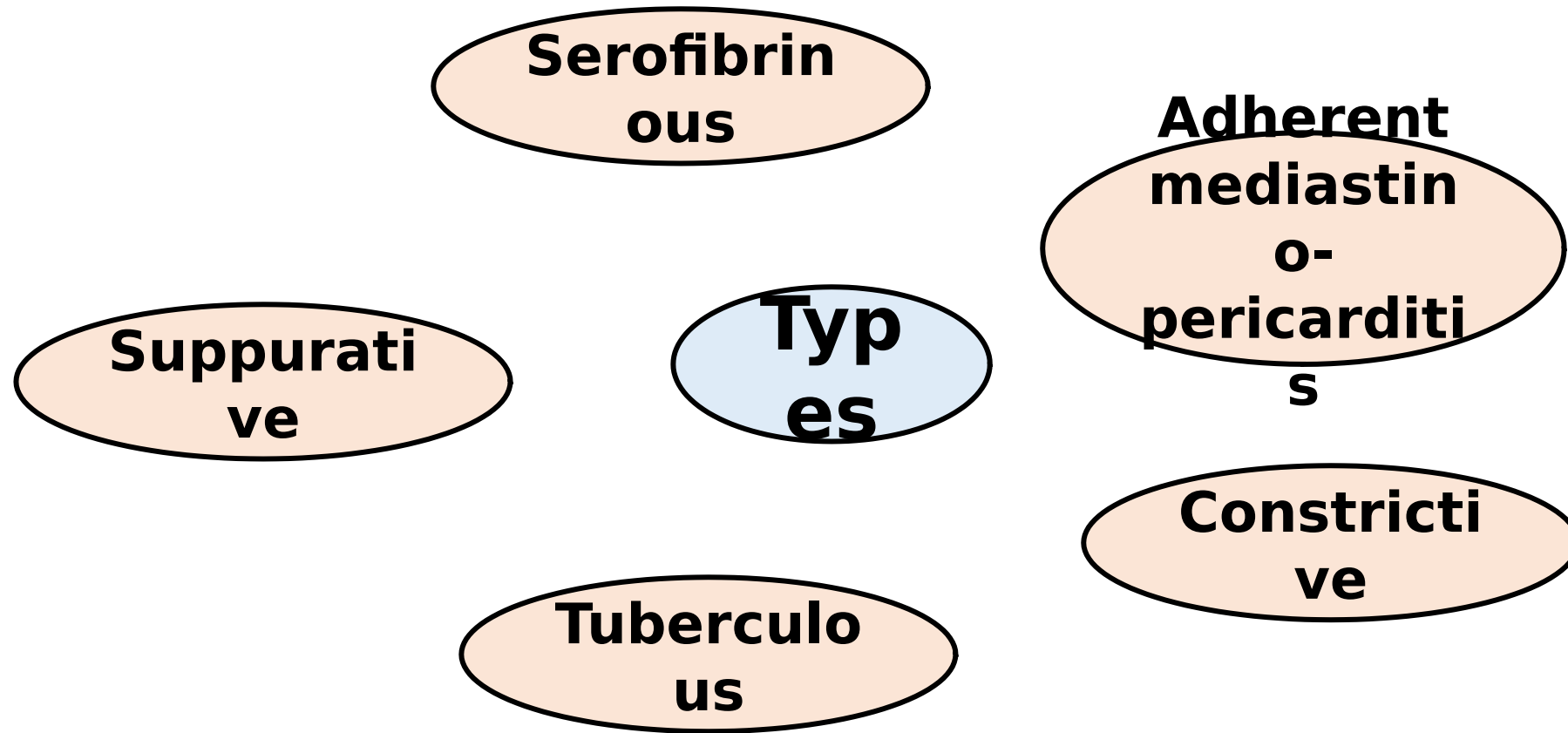
Pericarditis



Hydopericardium

Haemopericardium

Pericarditis



Pericarditis

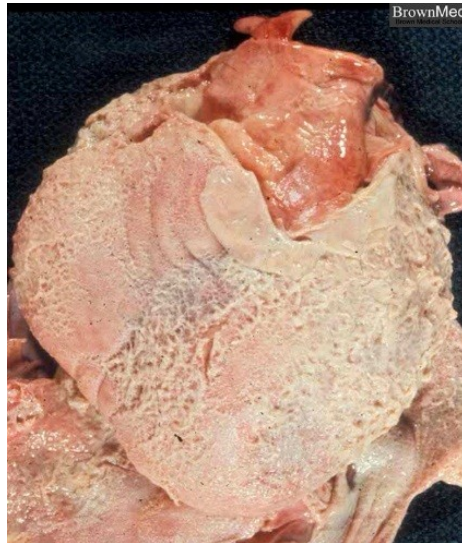


	1. Serofibrinous	2. Suppurative	3. Tuberculous
Etiology	Rheumatic fever, Uraemia, Myocardial infarction, Viral, Bacterial	Pyogenic bacteria through: ❖ Blood spread (septicemia) ❖ Direct/ lymphatic spread (rib osteomyelitis, lung infection)	Spread from pulmonary TB
Pathology	The fibrin is precipitated on - inner surface of parietal layer - outer surface of visceral layer → The pericardium appears thickened	Pus in the pericardial sac Severe toxemia	The pericardial sac is filled with caseous material

Pericarditis

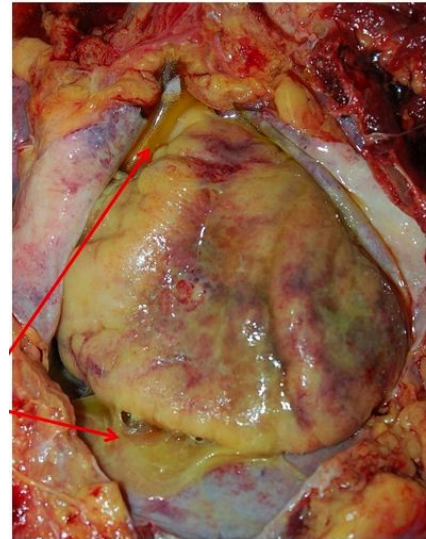


Serofibrinous pericarditis



<https://image.slidesharecdn.com/inflammation-6-120815190144-phpapp02/95/inflammation-6-20-728.jpg?cb=1345057398>

Suppurative pericarditis



<https://classconnection.s3.amazonaws.com/210/flashcards/1428210/png/41342562010682-thumb400.png>

Tuberculous pericarditis



http://www.pathologylearningcentre.uct.ac.za/sites/default/files/image_tool/images/408/II_vii_1_R_annotated.jpg

Pericarditis



4. Adherent mediastinopericarditis

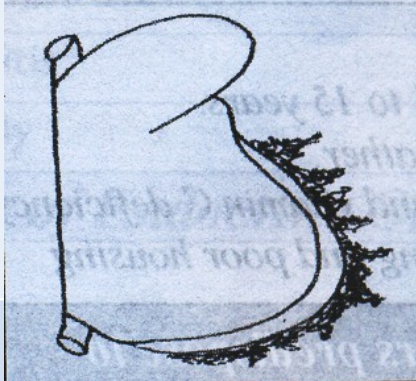
5. Constrictive pericarditis

Etiology

Healing of serofibrinous, suppurative or tuberculous pericarditis

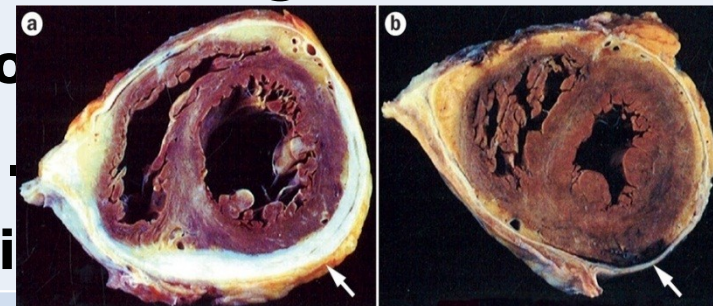
Pathology

- ☹ Obliterated pericardial sac
- ☹ Adherence of parietal pericardium to surrounding structures
- ☹ Cardiac hypertrophy & dilatation occur



https://encrypted-tbn0.gstatic.com/images?q=tbn:ANd9GcSVugxN2M9theidcWGUyt_OitmlDmUjfWqW9nonnPS-8uh27_y

- Fibrosis → adherence of visceral to parietal pericardium
- obliterated pericardial sac:
- Reduced cardiac diastolic filling.
 - Constriction of the venae cava orifices & generalized venous



<https://media.springernature.com/full/nature-static/assets/v1/image-assets/nrcardio.2014.100-f1.jpg>

co
N
di

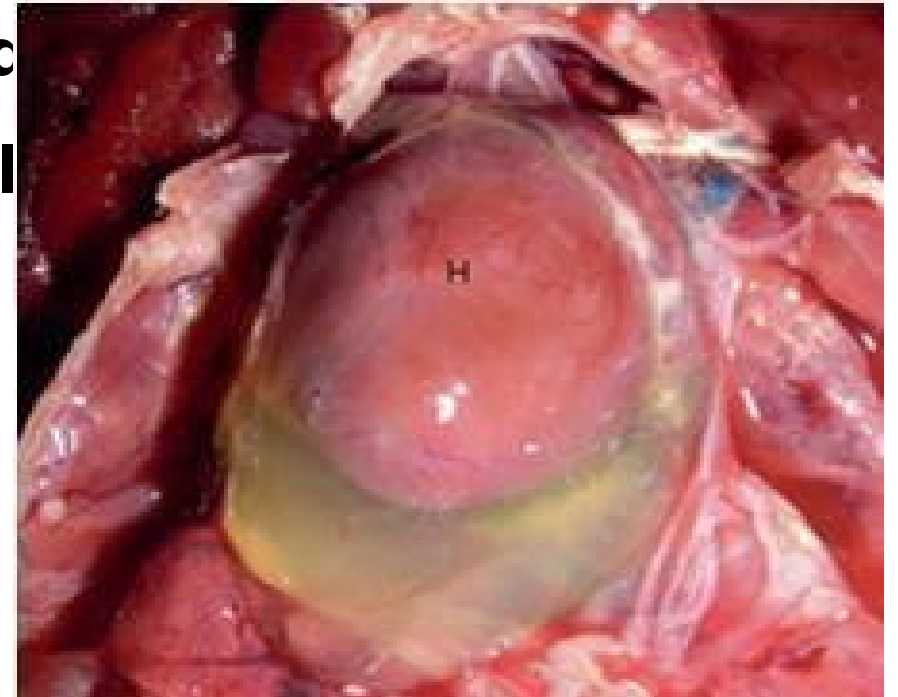
phy or

Hydropericardium



Definition: Accumulation of transudate in the pericardial sac

Etiology: As a part of generalized edema
(Cardiac, renal, nutritional)



<https://ars.els-cdn.com/content/image/3-s2.0-B9780323357753000102-on010-021-9780323357753.jpg>

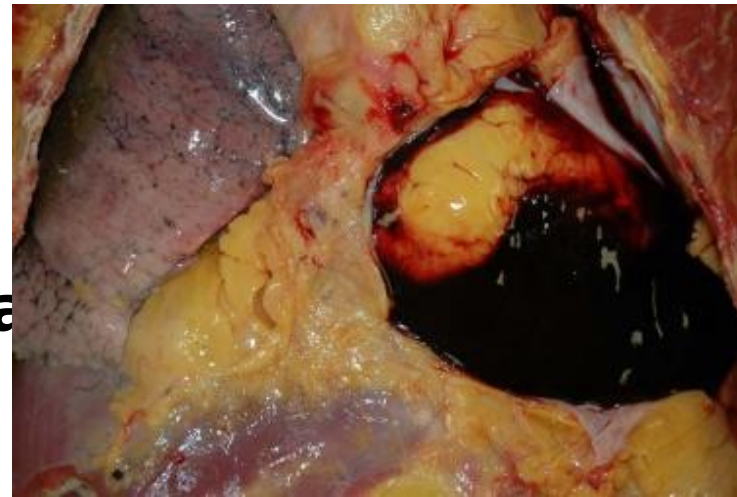
Haemopericardium



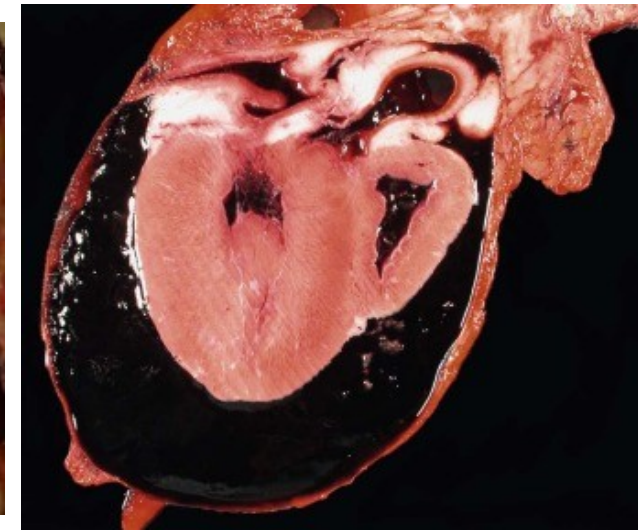
Definition: Accumulation of blood within the pericardial sac

Etiology:

- Trauma
- Rupture of myocardial infarction
- Rupture of aneurysm
- Blood diseases e.g. leukemia



<https://library.med.utah.edu/WebPath/jpeg5/CV155.jpg>



<https://ars.els-cdn.com/content/image/3-s2.0-B9780702053191000128-f001v003-026-9780702053191.jpg>

Effects: Cardiac tamponade →

Acute heart failure →

Shock

New Five Years Program

(Cardio-Pulmonary Module)

Pericardial diseases (Quiz):



Write true or false:

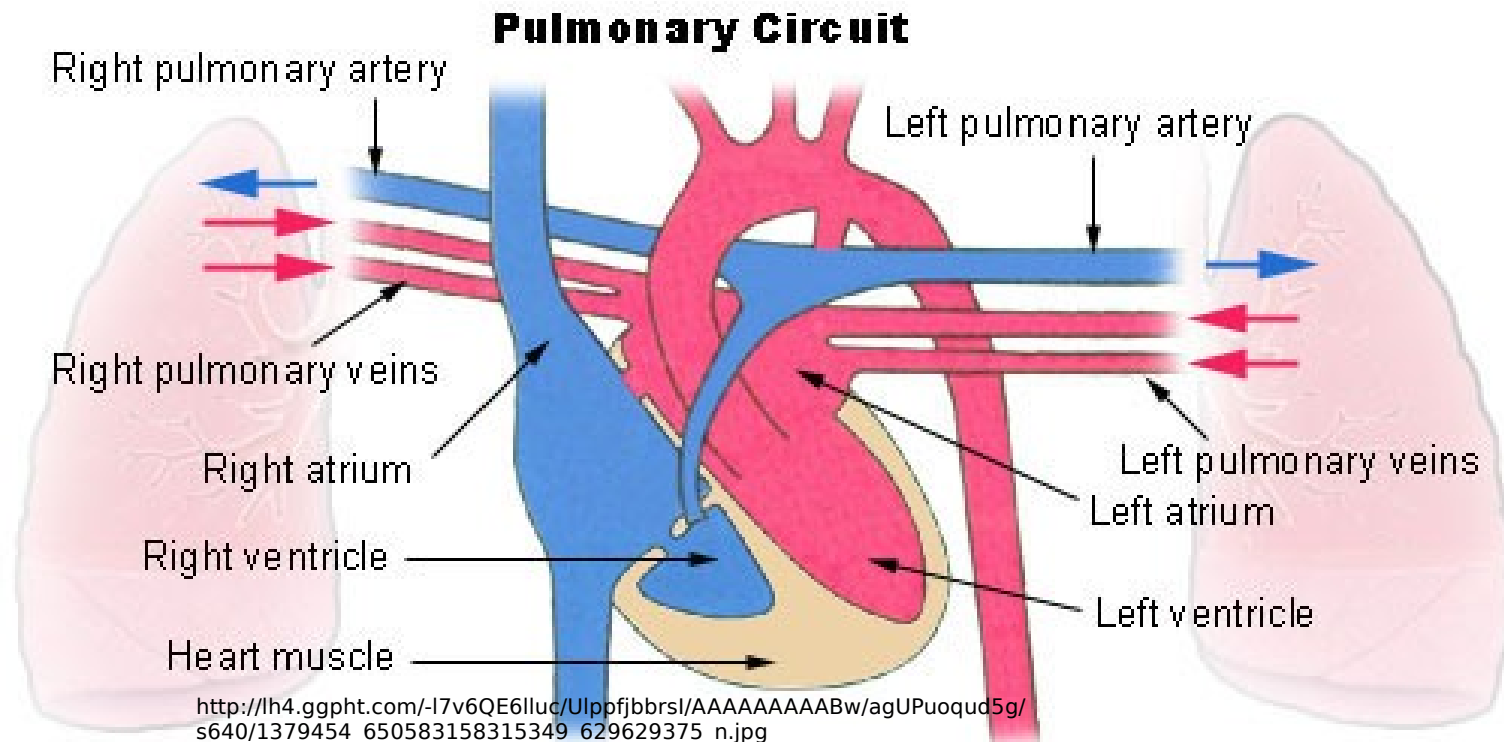
1. Lobar pneumonia may be complicated by hydropericardium **False**
2. Constrictive pericarditis is associated with cardiac hypertrophy **False**

Heart Failure



Definition: Failure of the ventricular contractions to maintain sufficient cardiac output (C.O.) to meet the body

Types: Acute and Chronic



Heart Failure



Acute heart failure:

Aetiology:

- 1. Acute myocardial damage: recent infarction or myocarditis**
- 2. Massive pulmonary embolism** → **Acute Rt. sided failure**
- 3. Haemopericardium** → **heart compression** → **diastolic**

Effects: ^{filling} ^{C.O.} Acute congestion & edema (Pulmonary &/or Generalized)

Heart Failure



Chronic heart failure:

Pathogenesis Stages 2:

1- Stage of Compensation (the heart maintain adequate C.O.)

Slight chamber dilatation
→
slight stretch of myocardial fibers
→
stronger contractions

Compensatory hypertrophy
→
stronger contractions

Heart rate ↑ → tissue perfusion ↑

2- Stage of Decompensation (Failure)

Marked chamber dilatation
→
overstretch of myocardial fibers
→
weaker contractions

Hypertrophy + NO capillaries
→ ischemia → fibrosis
→
weakening & dilatation

Heart rate ↑ → cardiac fatigue

Heart Failure



Chronic heart failure: Types:

A- Left side heart failure:

Etiology:

1. Hypertension

2. Coronary heart disease Healed infarction
Arteriosclerotic heart disease

3. Valve disease: Aortic stenosis or incompetence, mitral incompetence

Heart Failure



Chronic heart failure: Types:

A- Left side heart failure:

Pathological features:

- 1. Hypertrophy & dilatation of Lt. atrium & ventricle.**
- 2. Pulmonary edema: leading to dyspnea, orthopnea & paroxysmal nocturnal dyspnea**
- 3. Chronic lung congestion → pulmonary hypertension → Rt. Side H.F.**
- 4. Low cardiac output manifestations: e.g. oliguria**

Heart Failure



Chronic heart failure: Types:

B- Right side heart failure:

Etiology:

1. Causes in left side of the heart

Mitral stenosis

Lt. side heart failure

2. Causes in right side of the heart

Pulmonary stenosis

Tricuspid incompetence

3. Congenital heart diseases: ASD, VSD

4. Core pulmonale: (Right side heart failure caused by lung

disease)

Lung fibrosis: e.g. T.B., bilharziasis

Emphysema

Heart Failure



Chronic heart failure: Types:

B- Right side heart failure:

Pathological features:

- 1. Hypertrophy & dilatation of Rt. atrium & ventricle.**
- 2. Chronic generalized congestion → generalized edema, cyanosis,...etc**

3. Low cardiac output manifestations.
Combined Lt. & Rt. Side heart failure = *Congestive heart failure*

Heart failure (Quiz):



Which of the following lesions is a cause of Core pulmonale?

- A. Left ventricular failure
- B. Myocardial infarction
- C. Aortic stenosis
- D. Pulmonary emphysema
- E. Cardiac tamponade

Heart failure (Quiz):



Which of the following lesions is a cause of Core pulmonale?

- A. Left ventricular failure
- B. Myocardial infarction
- C. Aortic stenosis
- D. Pulmonary emphysema**
- E. Cardiac tamponade

Key points:



- Cardiomyopathy is a cardiac disease due to myocardial dysfunction (mechanical / electric).
- Dilated cardiomyopathy is the most common type, while restrictive type is the rarest
- Healing of suppurative, tuberculous and serofibrinous pericarditis leads to adherent mediastino-pericarditis and constrictive pericarditis
- Heart failure may be acute or chronic
- Core pulmonale is right side heart failure due to lung

Suggested Textbooks



1. Mitchell R. Blood vessels. In Robbins and Cotran pathologic basis of disease, 10th edition. Kumar, Abbas & Aster (eds). Elsevier Saunders. Pages 487 to 491.
2. Cardiac pathology. In USMLE step 1 lecture notes, 2017. Kaplan INC, New York. Pages 112 -125

